

JOURNAL OF THE INTERNATIONAL SOCIETY

---

# LEONARDO

---

FOR THE ARTS SCIENCES AND TECHNOLOGY

Volume Contents and Author Index  
Volume 18, 1985



**Pergamon Press**

**Oxford    New York    Toronto    Sydney    Frankfurt**

Founder: Frank J. Malina (1912-1981)

JOURNAL OF THE INTERNATIONAL SOCIETY  
**LEONARDO**  
FOR THE ARTS SCIENCES AND TECHNOLOGY

Frank J. Malina founded the Journal *Leonardo* in 1967 as a professional journal for working artists to write about their own work. The Journal's interdisciplinary aims and scope reflect his many achievements as an aeronautical engineer, pioneer in rocketry, research administrator, promoter of international cooperation, artist and editor.

**Main Editorial Office**

*Leonardo*, 2112 Berkeley Way, Berkeley, CA 94704, U.S.A.

**European Editorial Office**

*Leonardo*, 8 rue Emile Dunois, 92100 Boulogne sur Seine, France

**Special Issue Editor**

Bryan Rogers

**Executive Editor**

Roger F. Malina

**Managing Editor**

Pamela Grant-Ryan

**Associate Editors**

Lisa Bornstein  
Elizabeth Crumley  
Marjorie Malina

**International Co-Editors**

Rudolf Arnheim (U.S.A.) 1113 South Seventh Street, Ann Arbor, MI 48103, U.S.A.  
Giorgio Careri (Italy) Dipartimento di Fisica, Università Roma I, 00185 Roma, Italy  
David Carrier (U.S.A.) Dept. of History and Philosophy, Carnegie-Mellon University, Schenley Park, Pittsburgh, PA 15213, U.S.A.  
Henri Gabriel (Belgium) 121 Rue Masui, 1000 Bruxelles, Belgium  
Jorge Glusberg (Argentina) Centro de Arte y Comunicación, Elpidio Gonzales 4070, Buenos Aires, Argentina  
John H. Holloway (U.K.) 43 Morland Avenue, Stoneygate, Leicester LE2 2PF, U.K.  
Madhoor Kapur (India) 10 Rajdoot Marg, Chanakyapuri, New Delhi 110021, India  
Carol Law (U.S.A.) 7722 Lynn Avenue, El Cerrito, CA 94530, U.S.A.  
Sheila Pinkel (U.S.A.) 126 Hart Avenue, Santa Monica, CA 90405, U.S.A.  
Robert Preusser (U.S.A.) 2 Willard Street Court, Cambridge, MA 02138, U.S.A.  
Peter Richards (U.S.A.) 1507 Diamond Street, San Francisco, CA 94131, U.S.A.  
Itsuo Sakane (Japan) 4-15-17, Naka-Machi, Machida-Shi, Tokyo 194, Japan  
Kirill Sokolov (U.S.S.R.) 213 Gilesgate, Durham City, DH1 1QN, U.K.  
Vladimir Tamari (Middle East) 2-15-14 Okusawa, Setagaya-ku, Tokyo 158, Japan  
David R. Topper (Canada) History Department, University of Winnipeg, Winnipeg, Manitoba R3B 2E9, Canada  
Makepeace Tsao (U.S.A.) 533 Antioch Drive, Davis, CA 95616, U.S.A.  
Steve Wilson (U.S.A.) 76 Coleridge, San Francisco, CA 94110, U.S.A.  
Lin Xiaoping (China) Chinese Artist's Association, May Fourth Avenue 1, Beijing, People's Republic of China

**Honorary Editors**

George Agoston (U.S.A.)  
L. Alcopley (U.S.A.)  
Roy Ascott (U.K.)  
Giulio C. Argan (Italy)  
Pierre Auger (France)  
Claude Berge (France)  
Vladimir Bonacić (Yugoslavia)  
Ray Bradbury (U.S.A.)  
Donald Brook (Australia)  
John Cage (U.S.A.)  
Nino Calos (Italy)  
Jean Cassou (France)  
Myron Coler (U.S.A.)  
Stuart Coyne (U.S.A.)  
Elmer Duncan (U.S.A.)  
John E. Fobes (U.S.A.)

Herbert W. Franke (Fed. Rep. Ger.)  
Yona Friedman (Israel)  
Reginald Gadney (U.K.)  
Mathias Goeritz (Mexico)  
Sir Ernst Gombrich (U.K.)  
Vic Gray (New Zealand)  
Richard L. Gregory (U.K.)  
Yusuf A. Grillo (Nigeria)  
Anthony Hill (U.K.)  
Thomas T. Ichinose (Japan)  
Peter Lloyd Jones (U.K.)  
Gyorgy Kepes (U.S.A.)  
Otto Klineberg (U.S.A.)  
Richard I. Land (U.S.A.)  
Jacques Mandelbrojt (France)  
Charles Mattox (U.S.A.)

I. R. Maxwell (U.K.)  
Joseph Needham (U.K.)  
Sean O'Driscoll (Ireland)  
Jaroslav Pluhar (Czechoslovakia)  
Frank Popper (France)  
Harry Rand (U.S.A.)  
Ervin Y. Rodin (U.S.A.)  
Lord Eric Roll (U.K.)  
Ednah Root (U.S.A.)  
Ronald Searle (U.K.)  
Allan Shields (U.S.A.)  
Ryszard Stanislawski (Poland)  
Cyril Stanley Smith (U.S.A.)  
K. G. Subramanyan (India)  
Pierre Székely (France)  
Jan Zach (U.S.A.)

**Acknowledgements**

Partial support for this volume of *Leonardo* has been provided by San Francisco State University, the Frederic Burk Foundation for Education, the U.S. National Endowment for the Arts, and the Marcus and Bertha Coler Philanthropic Fund of the Jewish Communal Fund of New York. The Editors wish to thank Rita Bronowski for her assistance in developing the Special Issue of *Leonardo*.

**ISAST Board of Directors**

Roger F. Malina, Theodosia Ferguson Tsao, Aimee Tsao, Marjorie Malina, Robert Maxwell, Samuel Okoshken, Lord Eric Roll of Ipsden

**Publisher's Offices**

Pergamon Press Ltd, Headington Hill Hall, Oxford OX3 0BW, U.K. Tel. 0865 64881

Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A. Tel. 914-592 7700

Advertising will be accepted from museums, art schools, book publishers, art material manufacturers, travel agencies, shipping companies etc. Address enquiries to Advertising Manager, U.K. or U.S.A. offices (addresses given above)

**Microform Subscriptions and Back Issues**

Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscriptions are available on microfiche simultaneously with the paper edition and on microfilm on completion of the annual index at the end of the subscription year.

Copyright © 1985 ISAST.

It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to ISAST if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organisations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

Indexed/abstracted in  
Current Contents

**PHOTOCOPYING INFORMATION FOR  
USERS IN THE U.S.A.**

The Item-Fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying beyond that permitted by Section 107 or 108 of the United States Copyright Law is paid. The appropriate remittance of \$3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 21 Congress Street, Salem, MA 01970. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying. In case of doubt please contact your nearest Pergamon office.  
The Item-Fee Code for this publication is: 0024-094X/85 \$3.00 + 0.00

ISSN 0024-094X

## LIST OF CONTENTS

### Volume 18 Number 1 1985

#### Artists' Articles

TODD SILER: Neurocosmology: Ideas and Images Towards an Art-Science-Technology Synthesis	1
LARRY WENDT: Sound Poetry: I. History of Electro-Acoustic Approaches.	11
II. Connections to Advanced Electronic Technologies	

#### Artists' Notes

ALEXANDER: <i>The Great Tower</i> : Conception and Construction of a Very Large Bronze Sculpture	24
EVE LARAMEE: Process and Natural Phenomena As Conceptual Points of Departure in Extended-Format Sculpture	28
STAN REPAR: Realistic Paintings of the Landscape: An Approach to Macrocosmic Concerns	32

#### General Articles

DAVID CARRIER: On the Possibility of Aesthetic Atheism: Philosophy and the Market in Art	35
HENRI GABRIEL: The Hanging Mobile: A Historical Review	39
BORIS V. RAUSCHENBACH: Perspective Pictures and Visual Perception	45

Historical Perspectives on the Arts, Sciences and Technology	50
--	----

International News and Opportunities	53
--------------------------------------	----

Letters	55
---------	----

Software Survey Section	1
-------------------------	---

### Volume 18 Number 2 1985

#### Editorial

BRYAN ROGERS	57
--------------	----

#### Artists' Articles

NICOLAS SCHÖFFER: Sonic and Visual Structures: Theory and Experiment	59
STEVE POLESKIE: Art and Flight: Historical Origins to Contemporary Works	69
BEAUVAIS LYONS: <i>The Excavation of the Apasht</i> : Artifacts from an Imaginary Past	81

#### Artists' Notes

HUANG YONGPING: Painting with Industrial Technology: Looking for New Substitutions	91
ROBERT R. SNYDER: Video Color Control by Means of an Equal-Tempered Keyboard	93
OPY ZOUNI: Space Through Colour and Illusion	96

#### General Note

SUSAN E. METROS: <i>Electronic Thinking Cap</i> : Microcomputer-Enhanced Creative Problem-Solving	100
---	-----

#### Document

H. W. FRANKE: The New Visual Age: The Influence of Computer Graphics on Art and Society	105
---	-----

#### Theoretical Perspectives on the Arts, Sciences and Technology

DAVID CARRIER: Part II: Postmodernist Art Criticism	108
---	-----

International News and Opportunities	114
--------------------------------------	-----

Book Reviews	116
--------------	-----

Letters	126
---------	-----



## Volume 18 Number 3 1985

### Editorial

BRYAN ROGERS	131
--------------	-----

### Artists' Articles

ROBERT N. FISHER and RAYMON J. MASTERS: Computer-Aided Sculpture: Visual and Technical Considerations	133
MYRON W. KRUEGER: <i>VIDEOPLACE</i> : A Report from the ARTIFICIAL REALITY Laboratory	145

### Artists' Notes

PEARL HIRSHFIELD: Sculptural Constructions Involving Water Dynamics	153
EZRA ORION: Sculpture in the Solar System: From Geologically Based Earthworks to Astro-Sculpture	157
TAPTA: Soft Sculpture: Textiles in Architectural Space	161
YAKOV VINKOVETSKY: Painting As Process and Result	165

### General Articles

SUSAN E. BRENNAN: Caricature Generator: The Dynamic Exaggeration of Faces by Computer	170
TAMÁS F. FARKAS and PÉTER ÉRDI: 'Impossible' Forms: Experimental Graphics and Theoretical Associations	179
KIRILL SOKOLOV: Aleksandr Rodchenko: New Documents	184

### General Notes

A. L. LOEB: Art, Science and History: On Linda Henderson's <i>The Fourth Dimension and Non-Euclidean Geometry in Modern Art</i>	193
DAVID R. TOPPER and JOHN H. HOLLOWAY: Interrelationships of the Arts, Sciences and Technology: A Bibliographic Up-Date	197

### Document

DAVID PERLMAN: Frank Oppenheimer 1913-1985	201
--	-----

### Historical Perspectives on the Arts, Sciences and Technology

International News and Opportunities	203
Letters	207
	211

## Volume 18 Number 4 1985

### Editorial

ERIC ROLL: Jacob Bronowski	215
----------------------------	-----

### Introduction to the Symposium

MICHAEL S. GREGORY: A Word About NEXA	216
---------------------------------------	-----

### Symposium Presentations

CHARLES S. SHAPIRO: Jacob Bronowski: A Retrospective	219
RITA BRONOWSKI: Bruno: A Personal View	223
CLIFFORD GROBSTEIN: Bronowski, Progression and Human Progress	226
GERALD HOLTON: On the Integrity of Science: The Issues Since Bronowski	229
BRUCE MAZLISH: The Three and a Half Cultures	233
JONAS SALK: The Next Evolutionary Step in the Ascent of Man in the Cosmos	237
PAUL SALTMAN: The Softest Hard Sell: Bronowski's Approach to Communicating Science	243

### Selected Bronowski Writings

The Creative Process	245
The Long Childhood	249
New Concepts in the Evolution of Complexity: Stratified Stability and Unbounded Plans	254
Science As a Humanistic Discipline	261
Science in the New Humanism	265
Technology and Culture in Evolution	270
A Twentieth-Century Image of Man	275

### Document

DAVID R. TOPPER: Jacob Bronowski: A Sketch of His Natural Philosophy	279
--	-----

### Bio-Bibliography of Jacob Bronowski

	282
--	-----